



Improve Energy Efficiency with ENERGY STAR Geothermal Heat Pumps

Builder Guide



DESCRIPTION

Geothermal heat pumps are similar to ordinary air-conditioners and heat pumps, but they exchange heat with the ground - instead of the outside air - to provide heating, air-conditioning, and, in many cases, hot water. Geothermal heat pumps take advantage of stable temperature conditions in the ground year round; compared to outside air, the ground is much warmer in winter and cooler in summer. This makes geothermal heat pumps among the most efficient heating and cooling technologies currently available.



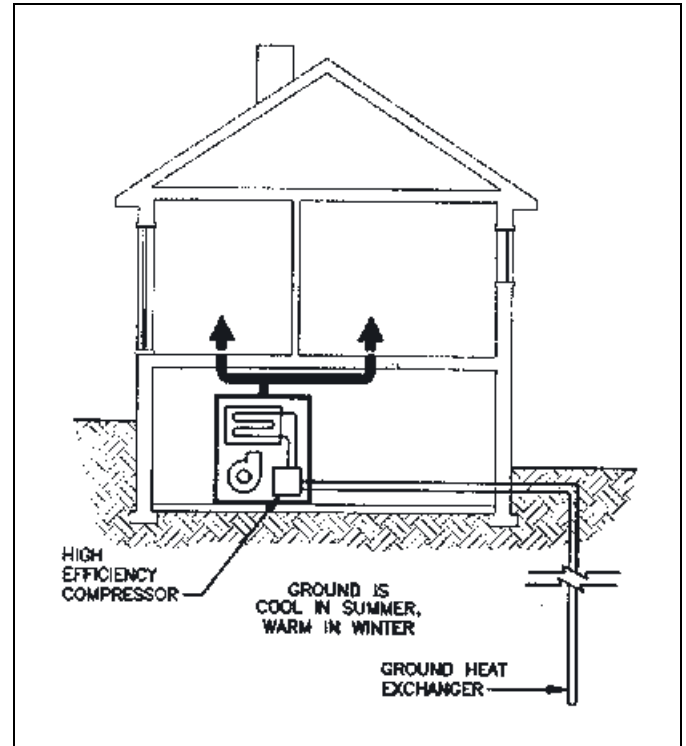
BENEFITS

Providing energy efficient houses with comfortable high efficiency heating and cooling equipment is a great way to increase customer satisfaction, reduce callbacks, and increase referrals. As a result, look for increased business and profits.

☐ **ENERGY STAR Geothermal Heat Pumps save money.**

A high efficiency ENERGY STAR Geothermal Heat Pump can reduce heating and cooling bills by 25 - 50% over a minimum efficiency air source air-conditioner or heat pump. For a typical household this can mean hundreds of dollars savings per year.

☐ **High efficiency geothermal heat pumps feature higher quality**



components that last longer.

Look for quality construction, improved technology, and attention to detail in high efficiency geothermal heat pumps that can result in longer equipment life and often longer warranties on key components. In addition, unlike air source heat pumps, the compressor is typically located indoors further reducing weather related damage and prolonging expected equipment life.

☐ **Geothermal heat pumps feature silent outdoor operation.**

Since their only outdoor components are pipes buried under the ground, there is no need for outdoor units that can be noisy. Thus, geothermal heat pump owners enjoy impressive peace and quiet inside and outside their homes.

- ☐ **Most geothermal heat pumps include water heating capabilities.**

Since geothermal heat pumps heat water instead of air, they are easily configured to efficiently provide domestic hot water in addition to space heating and cooling. Furthermore, in the summer, they can use the “waste heat” from air-conditioning to heat water for free. This helps make geothermal heat pumps one of the lowest operating cost options for heating, cooling, and hot water heating.



INTEGRATION

- ☐ **Properly sizing Geothermal heat pumps and their ground heat exchangers can help ensure energy efficiency and comfort.**

Equipment sizing affects operating efficiency, especially with geothermal heat pumps. Since well drilling and loop installation costs are high, it's an expensive mistake to provide more tons of capacity than needed. It may also be tempting to skimp on the well depth to save on installation costs. This practice can result in lowered efficiency, possibly below what an air source heat pump would provide. It's disappointing to pay extra for a high efficiency system that works poorly. The key to achieving the maximum benefit from a geothermal heat pump installation is to carefully size the ground loop and the compressor rather than using “rule-of-thumb” sizing techniques. See fact sheet on “Right Sizing HVAC Equipment” for more information.

- ☐ **Duct systems should also be properly sized and sealed to prevent system losses.**

Duct system losses can be responsible for degrading the efficiency of a geothermal system by more than 20%. To get the most out of high efficiency geothermal heat pumps, a properly sized, tightly sealed and well insulated duct system should be installed. See “Right-Sizing Duct Systems and”Duct Sealing” fact sheets.

- ☐ **Coordinate ground loop installation with other construction activities.**

The type of excavation equipment needed for digging foundations, footings, fencing, drainage trenches, and swimming pools could be used to provide trenching for horizontal loop geothermal systems. Coordinating these excavating activities can lead to substantial cost reductions.

- ☐ **Coordination with Building Department may be required.**

Geothermal systems may entail special approvals or other coordination with some building and water departments. Check with local building and water department officials early in the design phase to resolve any possible issues.



RESOURCES

- ☐ For more information on ENERGY STAR HVAC Program and qualifying equipment, call 1-888-STAR YES.
- ☐ *ARI Directory of Certified Applied Air-Conditioning Products*, Air-conditioning and Refrigeration Institute, 1996. Available at 703-524-8800.
- ☐ *Closed-Loop/Ground Source Heat Pump Systems - Installation Guide*. International Ground Source Heat Pump Association, Oklahoma State University, 1988. Available at 1-800-346-0104.
- ☐ *Ground Source Heat Pump Manual*. Pennsylvania Department of Environmental Protection, Revised January, 1996. Publication Number: 3610-BK-DEP1562. Available @ 717-783-3638.
- ☐ *Geothermal Heat Pump Consortium*, 202-608-5500 or 1-888-333-GHPC.